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NEWS 5 Oct 27 Patent Assignee Code Dictionary now available  
in Derwent Patent Files  
NEWS 6 Oct 27 Plasdoc Key Serials Dictionary and Echoing added to  
Derwent Subscriber Files WPIDS and WPIX  
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=> s fullerene

L1 17787 FULLERENE

=> s dna

L2 1165620 DNA

=> s compact?

L3 136616 COMPACT?

=> s derivat?

L4 500312 DERIVAT?

=> d his

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FILE 'CAPLUS, BIOSIS, CABA' ENTERED AT 13:05:46 ON 04 MAR 2001

L1 17787 S FULLERENE

L2 1165620 S DNA

L3 136616 S COMPACT?

L4 500312 S DERIVAT?

=> s 11 and 12

L5 60 L1 AND L2

=> s 15 and 13

L6 1 L5 AND L3

=> s 11 and 14

L7 890 L1 AND L4

=> d 16 abs ibib

L6 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2001 ACS

AB This document discloses a novel means for **DNA compaction**.  
. **Fullerene** derivs. having 1 to 4 nitrogen-contg. hydrophilic  
side chains or salts thereof are to be used in the above means. A  
**fullerene** deriv. was prepd. and tested using calf thymus  
**DNA** and ethidium bromide.

ACCESSION NUMBER: 1999:595122 CAPLUS

DOCUMENT NUMBER: 131:237139

TITLE: **Fullerene** derivatives for potential use in  
gene therapy

INVENTOR(S):  
PATENT ASSIGN(S):  
SOURCE:

Nakamura, Eiichi; Sawamura, Masaya; Isobe, Hiroyuki  
Fujisawa Pharmaceutical Co., Ltd., Japan  
PCT Int. Appl., 37 pp.  
CODEN: PIXXD2  
Patent  
Japanese

DOCUMENT TYPE:  
LANGUAGE:  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9946235	A1	19990916	WO 1999-JP1146	19990310
W: JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1069107	A1	20010117	EP 1999-907890	19990310
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, PT, IE, FI				
			JP 1998-58614	19980310
			WO 1999-JP1146	19990310

PRIORITY APPLN. INFO.:  
MARPAT 131:237139  
4

OTHER SOURCE(S):  
REFERENCE COUNT:  
REFERENCE(S):

P2143

- (1) Friedman, S; J Am Chem Soc 1993, V115(15), P6506  
CAPLUS
- (2) Nakamura, E; Bull Chem Soc Jpn 1996, V69(8),  
CAPLUS
- (3) The Regents Of The University Of California; US  
5811460 A CAPLUS
- (4) The Regents Of The University Of California; WO  
9519949 A1 1995 CAPLUS

=> d his

(FILE 'HOME' ENTERED AT 13:05:18 ON 04 MAR 2001)

FILE 'CAPLUS, BIOSIS, CABA' ENTERED AT 13:05:46 ON 04 MAR 2001

L1	17787 S FULLERENE
L2	1165620 S DNA
L3	136616 S COMPACT?
L4	500312 S DERIVAT?
L5	60 S L1 AND L2
L6	1 S L5 AND L3
L7	890 S L1 AND L4

=> d 15 1-10 abs ibib

L5 ANSWER 1 OF 60 CAPLUS COPYRIGHT 2001 ACS  
AB Water-sol. fullerenes have gained considerable attention recently for their potential use as biol. agents. **Fullerene** derivs. have been shown to display activity against HIV protease, neurodegenerative diseases, to act as agents for DNA cleavage, and most recently to act as inhibitors of nitric oxide synthase. These interesting biol. properties are enhanced by the finding that most **fullerene** derivs. have unusually low toxicity compared with typical drugs. In the past, biol. studies were plagued by the fact that fullerenes are not water sol. Recently, we have come to a better understanding on how to effectively synthesize water-sol. **fullerene** derivs., enabling us to harness the extraordinary properties of fullerenes. Herein, we report our investigations on the properties of water-sol. derivs. of C60 and

c70.

ACCESSION NUMBER: 2001:88069 CAPLUS  
 TITLE: Properties of water ble fullerene derivatives  
 AUTHOR(S): Richardson, Christine F.; Schuster, David I.; Wilson, Stephen R.  
 CORPORATE SOURCE: Department of Chemistry, New York University, New York, NY, 10003, USA  
 SOURCE: Proc. - Electrochem. Soc. (2000), 2000-11(Fullerenes 2000--Volume 9: Functionalized Fullerenes), 226-232  
 CODEN: PESODO; ISSN: 0161-6374  
 PUBLISHER: Electrochemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 REFERENCE COUNT: 14  
 REFERENCE(S): (5) Dugan, L; Proc Natl Acad Sci U S A 1997, V94, P9434 CAPLUS  
 (7) Guldi, D; J Phys Chem 1995, V99, P13487 CAPLUS  
 (8) Jensen, A; Biorg Med Chem Lett 1996, V4, P767 CAPLUS  
 (9) Jensen, A; J Am Chem Soc 1997, V119, P7303 CAPLUS  
 (10) Lamparth, I; Tetrahedron 1996, V52, P5065 CAPLUS  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 2 OF 60 CAPLUS COPYRIGHT 2001 ACS  
 AB The synthesis of novel functionalized fullerene derivs. is reported: a DNA minor groove binder such as trimethoxy-indole-2-carboxylate (TMI) and an oligonucleotide chain have been covalently linked to C60 with the aim of duplicating DNA interactions for increasing sequence selectivity.

ACCESSION NUMBER: 2001:8059 CAPLUS  
 TITLE: Synthesis of a hybrid fullerene -trimethoxyindole-oligonucleotide conjugate  
 AUTHOR(S): Bergamin, Massimo; Da Ros, Tatiana; Spalluto, Giampiero; Prato, Maurizio; Boutorine, Alexandre  
 CORPORATE SOURCE: Dipartimento di Scienze Farmaceutiche, Universita di Trieste, Trieste, 34127, Italy  
 SOURCE: Chem. Commun. (Cambridge) (2001), (1), 17-18  
 CODEN: CHCOFS; ISSN: 1359-7345  
 PUBLISHER: Royal Society of Chemistry  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 REFERENCE COUNT: 14  
 REFERENCE(S): (1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS  
 (2) Boger, D; Angew Chem, Int Ed Engl 1996, V35, P1438 CAPLUS  
 (3) Boger, D; J Org Chem 1990, V55, P4499 CAPLUS  
 (5) Boutorine, A; Bioconj Chem 1990, V1, P350 CAPLUS  
 (7) Godovikova, T; Bioorg Khim 1989, V15, P1246

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ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 3 OF 60 CAPLUS COPYRIGHT 2001 ACS  
 AB In order to elucidate the spectrum of biol. and antiviral activities, the activity of adducts with polyvinylpyrrolidone (PVP) of unmodified fullerene C60 and some its derivs. on various types of viruses (influenza A and B, herpes simplex and human parainfluenza virus type 3) was studied. Adducts C60/PVP are effective both on RNA- and DNA-contg. viruses and their activity depends on fullerene content and PVP mol. mass. Their inhibitory action equally distributes during the full cycle of virus reprod. Therefore the adducts C60/PVP can be classified as membranotropic antiviral compds. which interfere with the late membrane-dependent stages of enveloped virus morphogenesis.

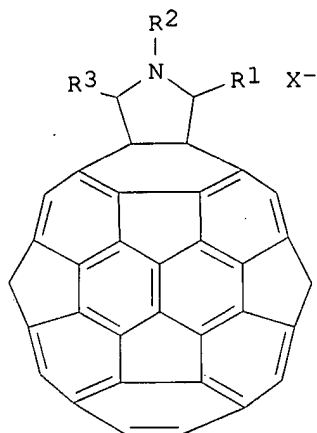
ACCESSION NUMBER: 2000:846601 CAPLUS  
 TITLE: Study of the biological activity of the adducts of fullerenes with poly(N-vinylpyrrolidone)  
 AUTHOR(S): Piotrovsky, L. B.; Dumpis, M. A.; Poznyakova, L. N.; Kiselev, O. I.; Kozeletskaya, K. N.; Eropkin, M. Yu.; Monaenkov, A. O.  
 CORPORATE SOURCE: Institute of Experimental Medicine RAMS, St. Petersburg, 197376, Russia  
 SOURCE: Mol. Cryst. Liq. Cryst. Sci. Technol., Sect. C (2000), 13(1-4), 41-50  
 CODEN: MOMAEO; ISSN: 1058-7276  
 PUBLISHER: Gordon & Breach Science Publishers  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 REFERENCE COUNT: 16  
 REFERENCE(S): (2) Eletsksii, A; Uspechi Phys Nauk (in Russian) 1995, V165, P977 CAPLUS  
 (3) Jensen, A; Bioorgan Med Chem 1996, V4, P767  
 CAPLUS (5) Kiselev, O; Docl Akad Nauk (in Russian) 1998, V361, P547 CAPLUS  
 (6) Kiselev, O; Mol Mat 1998, V11, P121 CAPLUS  
 (7) Kiselev, O; Molec Biol (in Russian) 1994, V28(5), P1009 CAPLUS  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 4 OF 60 CAPLUS COPYRIGHT 2001 ACS  
 AB A review, with 113 refs. The topics discussed include: enzyme inhibition/receptor binding; anticancer/antiviral; cell signaling-apoptosis; **DNA** and genomic applications; photodynamic therapy; electron transfer and membrane effects; antioxidant properties; radiotherapy, tracer studies, and medical imaging; immunol. of fullerenes;

carbon nanotubes; metab., excretion, and toxicity; and com. prospects.

ACCESSION NUMBER: 2000:744069 CAPLUS  
 DOCUMENT NUMBER: 134:111680  
 TITLE: Biological aspects of fullerenes  
 AUTHOR(S): Wilson, Stephen R.  
 CORPORATE SOURCE: Department of Chemistry, New York University, New York, NY, USA  
 SOURCE: Fullerenes: Chem., Phys. Technol. (2000), 437-465. Editor(s): Kadish, Karl M.; Ruoff, Rodney S. John Wiley & Sons, Inc.: New York, N. Y.  
 CODEN: 69AMWR  
 DOCUMENT TYPE: Conference; General Review  
 LANGUAGE: English  
 REFERENCE COUNT: 143  
 REFERENCE(S): (3) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS  
 (4) Andersson, T; J Chem Soc Chem Commun 1992, P604 CAPLUS  
 (6) Anon; CAPLUS  
 (8) Atwood, J; Nature 1994, V368, P229 CAPLUS  
 (10) Baierl, T; Exp Toxicol Pathol 1996, V48(6), P508 CAPLUS  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 5 OF 60 CAPLUS COPYRIGHT 2001 ACS  
 GI



I

AB The **fullerene** derivs. I [R1, R3 = H, C1-6 alkyl, C1-6 alkoxy, C2-10 heterocyclyl contg. 1-4 N, S, and/or P, C1-12 hydrocarblyl contg.

1-4

N, S, and/or P in the chain part, in which 1 of the heteroatoms is cationized by being substituted with C1-6 alkyl, (C1-6 alkyl)vinyl, benzyl; R1 and/or R3 = cationic group; R2 = H, C2-7 acyl, (CH2)*n*R4; R4 = H, C1-6 alkyl, C1-6 alkoxy, C6-12 aryl which be substituted with 1-5 C1-6 alkyl or alkoxy; *n* = 1-3; X- = counter anion] are prepd. Also claimed

are

conductive double-stranded **DNA** fragments prepd. by treating double-stranded **DNA** fragments with I. The **DNA** fragments made conductive are useful for electrochem. detection of **DNA** using a hybridization method. A satd. aq. soln. of I (R1 = N-methylpyridinium-2-yl, R2 = Me, R3 = H, X- = CF3SO3-), prepd. from 2-pyridinecarboxaldehyde, N-methylglycine, **fullerene** (C60), and CF3SO3H, was treated with calf thymus **DNA**, and electrochem. properties of the complex was also measured.

ACCESSION NUMBER: 2000:733051 CAPLUS

DOCUMENT NUMBER: 133:296376

TITLE: Water-soluble **fullerene** derivatives and conductive double-stranded **DNA** fragments complexed with them

INVENTOR(S): Takenaka, Shigeo; Yamashita, Kenichi; Takagi, Makoto; Hatta, Taizo; Tsuge, Otohiko

PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000290278	A2	20001017	JP 1999-96831	19990402

OTHER SOURCE(S): MARPAT 133:296376

L5 ANSWER 6 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 32 refs. **Fullerene** (C60, C70, etc.) is an effective photosensitizer and its utilization as a pharmacophore for photo-chemotherapy of tumors has received considerable attention. We developed a method to solubilize fullerenes into water with polyvinylpyrrolidone (PVP) as a detergent. By using thus prepd. aq. **fullerene** solns., we have clarified a series of biol. activities of **fullerene** under photoirradn. which include **DNA** -cleavage, hemolysis, mutagenicity, cancer-initiation, and cytotoxicity.

A newly synthesized C60 deriv. with an acridine moiety as a DNA-chelate function showed much more effective DNA-cleaving activity in the presence of NADH. Visible light irradiation of PVP-solubilized C60 in water in the presence of NADH as a reductant and mol. oxygen resulted in the formation of  $\text{O}_2\cdot^-$ , which was detected by the EPR spin-trapping method. Formation of  $\text{O}_2\cdot^-$  was also evidenced by the direct observation of a characteristic signal of  $\text{O}_2\cdot^-$  by the use of a low-temp. EPR technique at 77 K. On the other

hand, no formation of  $\text{O}_2$  was observed by the use of TEMP as a  $\text{O}_2$  trapping agent. No near-IR luminescence of  $\text{O}_2$  was also observed in the aq. C60/PVP/ $\text{O}_2$  system. These results suggest that photoinduced bioactivities of the PVP-solubilized fullerene are caused not by  $\text{O}_2$ , but by reduced oxygen species ( $\text{O}_2\cdot^-$ ,  $\cdot\text{OH}$ ) which are generated by the electron-transfer reaction of C60 with mol. oxygen.

ACCESSION NUMBER: 2000:727070 CAPLUS  
DOCUMENT NUMBER: 134:2070  
TITLE: Reactive oxygen species responsible for biological actions of photoexcited fullerenes  
AUTHOR(S): Miyata, Naoki; Yamakoshi, Yoko; Nakanishi, Ikuo  
CORPORATE SOURCE: Division of Organic Chemistry, National Institute of Health Sciences, Tokyo, 158-8501, Japan  
SOURCE: Yakugaku Zasshi (2000), 120(10), 1007-1016  
CODEN: YKKZAJ; ISSN: 0031-6903  
PUBLISHER: Pharmaceutical Society of Japan  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Japanese

L5 ANSWER 7 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 14 refs. Fullerene (C60) has attracted increasing attention since it was discovered in 1985. It was expected that C60 would

have biol. actions caused by its unique shape and characteristic physicochem. properties, such as facial redox reactions and photosensitization. However, biol. studies have been hindered because of the hydrophobic nature of fullerene. In an attempt to overcome the problems associated with insolubility in aq. soln., the scope of application of fullerene and its derivs. in biol. has been broadened. This article discusses applications of fullerene and its water-sol. derivs. in biol., such as inhibition of HIV-1 protease, cleavage of DNA, free-radical scavenging and influence on cell membranes; possible mechanisms of interaction between fullerenes and biol. matrixes are reviewed.

ACCESSION NUMBER: 2000:636839 CAPLUS  
DOCUMENT NUMBER: 134:36600  
TITLE: Applications of fullerene and its derivatives in biology  
AUTHOR(S): Xiao, Chun-Hua; Wu, Cai-Ying  
CORPORATE SOURCE: College of Chemistry and Environment Science, Wuhan University, Wuhan, 430072, Peop. Rep. China  
SOURCE: Wuhan Daxue Xuebao, Ziran Kexueban (2000), 46(2), 137-141  
CODEN: WTHPDI; ISSN: 0253-9888  
PUBLISHER: Wuhan Daxue Xuebao Bianjibu  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Chinese

L5 ANSWER 8 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The equil. consts. for complexation of C60 with poly(vinylpyrrolidone) (PVP) in water have been determined by UV-visible spectroscopy. The magnitude of the equil. consts. was found to describe the formation of a charge-transfer (CT) saturated 1:1 complex for  $[\text{PVP}] = 2.62\text{--}5.25 \times 10^{-2} \text{ M}$  ( $K = 1331.3 \text{ M}^{-1}$ ), and a contact-pairs complex for  $[\text{PVP}] = 7.0\text{--}12.25 \times 10^{-2} \text{ M}$  ( $K = 20.64 \times 10^{-2} \text{ M}^{-1}$ ). These results indicate

that the binding affinity of C60 for drug receptors, base pairs in double-stranded **DNA**, or AT-rich segments, its minor groove to form CT complexes is limited by the strong coordination in the C60/PVP-satd. CT complex or envelopment by the polymer ligand in the contact CT complex.

ACCESSION NUMBER: 2000:514114 CAPLUS  
DOCUMENT NUMBER: 133:247216  
TITLE: Highly Stable C60/Poly(vinylpyrrolidone)  
Charge-Transfer Complexes Afford New Predictions for  
Biological Applications of Underivatized Fullerenes  
AUTHOR(S): Ungurenasu, Cezar; Airinei, Anton  
CORPORATE SOURCE: P. Poni Institute of Macromolecular Chemistry, Iasi,  
6600, Rom.  
SOURCE: J. Med. Chem. (2000), 43(16), 3186-3188  
CODEN: JMCMAR; ISSN: 0022-2623  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
REFERENCE COUNT: 10  
REFERENCE(S): (2) Jensen, A; Biorg Med Chem 1996, V4, P767 CAPLUS  
(3) Karlin, K; J Am Chem Soc 1991, V113, P5868 CAPLUS  
(6) Satoh, M; Gen Pharmacol 1995, V26, P1533 CAPLUS  
(7) Sibley, S; J Phys Chem 1995, V99, P5274 CAPLUS  
(9) Smithrud, D; J Am Chem Soc 1991, V113, P5420  
CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 9 OF 60 CAPLUS COPYRIGHT 2001 ACS  
AB Solubilization of fullerenes in water by nucleophilic addn. of  
cyclodextrin-R-monoamines to C60, where R represents iminoalkyl and  
iminoaryl residues, is reported and studies involving the host-guest  
characteristics, free radical scavenging and **DNA**-cleaving  
properties indicate that this class of compds. has potential for a no. of  
biol. and medical applications.

ACCESSION NUMBER: 2000:403647 CAPLUS  
DOCUMENT NUMBER: 133:222916  
TITLE: Cyclodextrin-fullerenes: a new class of water-soluble  
fullerenes  
AUTHOR(S): Samal, Shashadhar; Geckeler, Kurt E.  
CORPORATE SOURCE: Lab. Appl. Macromol. Chem., Dep. Mater. Sci. Eng.,  
Kwangju Institute of Science and Technology, Kwangju,  
500-712, S. Korea  
SOURCE: Chem. Commun. (Cambridge) (2000), (13), 1101-1102  
CODEN: CHCOFS; ISSN: 1359-7345  
PUBLISHER: Royal Society of Chemistry  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
OTHER SOURCE(S): CASREACT 133:222916  
REFERENCE COUNT: 34  
REFERENCE(S): (4) Barclay, L; J Am Chem Soc 1999, V121, P6226  
CAPLUS  
(6) Beyer, C; Biochem Pharm 1998, V56, P1265 CAPLUS  
(7) Brettreich, M; Tetrahedron Lett 1998, V39, P2731  
CAPLUS  
(8) Chiang, L; Tetrahedron 1996, V52, P4963 CAPLUS  
(10) Diederich, F; Science 1996, V271, P317 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 10 OF 60 CAPLUS COPYRIGHT 2001 ACS  
AB A review with 32 refs. This review presents many examples of the  
biochem.  
activities of fullerenes and derivs., e. g. cytotoxic activity, selective  
**DNA** cleavage and antiviral activity against HIV. We also present  
some results of our testing which show that, despite its chem. and  
biochem. activity, **fullerene** matter does not present any health



hazard directly related to skin irritation and allergic risks.

ACCESSION NUMBER: 2000:282331 CAPLUS  
DOCUMENT NUMBER: 133:173071  
TITLE: Biochemical activity of fullerenes and their derivatives  
AUTHOR(S): Huczko, Andrzej; Lange, Hubert; Calko, Ewa  
CORPORATE SOURCE: Wyd. Chemii, Uniwersytet Warszawski, Warsaw, 02-093, Pol.  
SOURCE: Wiad. Chem. (1999), 53(11-12), 811-821  
CODEN: WICHAP; ISSN: 0043-5104  
PUBLISHER: Wydawnictwo Uniwersytetu Wroclawskiego  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Polish

=> d 15 11-20 abs ibib

L5 ANSWER 11 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Unavailable

ACCESSION NUMBER: 2000:195395 CAPLUS

DOCUMENT NUMBER: 132:334112

TITLE: Fullerenes and **fullerene** adducts: i. oxidation by charcoal. ii. singlet oxygen involvement in the reaction with amines. iii. photophysics of a series of adducts. iv. electron transfer from guanosine and 8-oxo-guanosine

AUTHOR(S): Bernstein, Robert

CORPORATE SOURCE: Univ. of California, Los Angeles, CA, USA

SOURCE: (1999) 147 pp. Avail.: UMI, Order No. DA9943816

From: Diss. Abstr. Int., B 2000, 60(8), 3949

DOCUMENT TYPE: Dissertation

LANGUAGE: English

L5 ANSWER 12 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Buckminsterfullerenols were recently investigated for their protective properties in different models of acute and chronic neurodegeneration.

We

tested C3-fullero-tris-methanodicarboxylic acid in our in vitro model of apoptotic neuronal death, which consists of shifting the culture K<sup>+</sup>

concn.

from 25 to 5 mM for rat cerebellar granule cells. The impairment of mitochondrial respiratory function as well as chromatin derangement and fragmentation of **DNA** in apoptotic oligonucleosomes that occur in these conditions were protected by this compd. in a concn.-dependent way. To assess whether antioxidant activity could account for the rescue of cerebellar granule cells from apoptosis, we tested the **fullerene** deriv. under FeSO<sub>4</sub>-induced oxidative stress and found significant protection. Thus, we visualized membrane and cytoplasmic peroxides and reactive oxygen species and found a significant redn. of the species

after

24 h in 5 mM K<sup>+</sup> with the **fullerene** deriv. Such evidence suggests that this compd. exerts a protective role in cerebellar granule cell apoptosis, likely reducing the oxidative stress.

ACCESSION NUMBER: 2000:134237 CAPLUS

DOCUMENT NUMBER: 132:274218

TITLE: C3-fullero-tris-methanodicarboxylic acid protects cerebellar granule cells from apoptosis

AUTHOR(S): Bisaglia, M.; Natalini, B.; Pellicciari, R.; Straface,

Schettini, E.; Malorni, W.; Monti, D.; Franceschi, C.;

G.

CORPORATE SOURCE: Institute of Chemistry and Technology of Drugs, University of Perugia, Perugia, Italy

SOURCE: J. Neurochem. (2000), 74(3), 1197-1204  
CODEN: JONRA9; ISSN: 0022-3042  
PUBLISHER: Lippincott Williams & Wilkins  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
REFERENCE COUNT: 49  
REFERENCE(S): (2) Atlante, A; Neurosci Lett 1998, V245, P127 CAPLUS  
(3) Behl, C; Cell 1994, V77, P817 CAPLUS  
(5) Brown, D; J Biol Chem 1993, V268, P3037 CAPLUS  
(6) Buege, J; Methods Enzymol 1978, V52, P302 CAPLUS  
(7) Burgoyne, R; J Neurocytol 1993, V22, P689 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 13 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A **fullerene** deriv. carrying pyridinium cation bound to sonicated calf thymus **DNA** in water. The binding ratio was 1 **fullerene** unit to 1 phosphate residue, giving the complex where **DNA** strand is seemingly coated with electron-conducting fullerenes. Cyclic voltammetry shows three-step redox couples in the complex, and the current peaks were broadened and shifted to pos. side as compared to uncomplexed **fullerene**. Binding of the **fullerene** deriv. onto grooves of **DNA** double helix was suggested.

ACCESSION NUMBER: 2000:125004 CAPLUS  
DOCUMENT NUMBER: 132:275569  
TITLE: **DNA** coated with cationic **fullerene** derivative. A possible microwire in water  
AUTHOR(S): Takenaka, Shigeori; Yamashita, Kenich; Takagi, Makoto;  
Hatta, Taizo; Tsuge, Otohiko  
CORPORATE SOURCE: Department of Chemical Systems and Engineering, Kyushu University, Fukuoka, 812-8581, Japan  
SOURCE: Nucleic Acids Symp. Ser. (1999), 42(Twentsixth Symposium on Nucleic Acids Chemistry, 1999), 149-150  
CODEN: NACSD8; ISSN: 0261-3166  
PUBLISHER: Oxford University Press  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
REFERENCE COUNT: 6  
REFERENCE(S): (1) Carter, M; J Am Chem Soc 1989, V111, P8901 CAPLUS  
(2) Cassell, A; Angew Chem Int Ed 1998, V37, P1528 CAPLUS  
(3) Liu, F; J Am Chem Soc 1999, V121, P917 CAPLUS  
(4) Takenaka, S; Chem Lett 1998, P989 CAPLUS  
(5) Takenaka, S; Chem Lett 1999, P319 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 14 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 111 refs. **Fullerene** (C60, C70, etc.) is a third carbon allotrope discovered in 1985, and a great deal of attention has been focused on its phys. and chem. properties in recent years. We are very interested in its biol. properties for use **fullerene** as a pharmacophore. We first developed a method of solubilizing **fullerene** itself in water to perform in vitro biol. screening. The concns. of aq. C60 and C70 soln. with 5% PVP are 400 and 200 .mu.g/mL,

resp. By using aq. **fullerene** solns. prepd. in this manner, we have clarified a series of biol. activities of **fullerene**, consisting of **DNA**-cleavage, hemolysis, cancer-initiation, and cell-toxicity under photoirradn., and chondrogenesis and inhibition of glutathione S-transferase activity without photoirradn. The biol. activity of photo-excited **fullerene** was found to be promising, because **fullerene** is a highly efficient photo-sensitizer. We synthesized a C60 deriv. with an acridine moiety as a **DNA**

-chelating function and assessed its effective **DNA**-cleaving activity. What kind of active species is involved in the biol. action of photo-excited **fullerene** is our next concern. Two pathways have been reported for the photo-excitation of **fullerene**. The so-called Type II energy transfer pathway generates singlet oxygen ( $^1O_2$ ), while the Type I electron transfer pathway gives a **fullerene** radical anion ( $C_{60}^{\cdot-}$ ,  $C_{70}^{\cdot-}$ ). In order to clarify the effective oxygen species actually responsible for the biol. action of photo-excited **fullerene**, we performed **DNA**-cleaving tests and EPR spectroscopic analyses under several conditions. The results showed that the photo-induced biol. activity of **fullerene** is not caused by  $^1O_2$ , but by reduced oxygen species ( $O_2^{\cdot-}$ ,  $\cdot OH$ ) generated by the electron transfer reaction of  $C_{60}^{\cdot-}$ , with mol. oxygen. Its specificity is thought to be mainly attributed to the high-reducible property of **fullerene**. Since the reductive activation of mol. oxygen by photo-excited **fullerene** was obsd. at physiol. concns. of NADH as the reductant, **fullerene** can be classified as an oxyl-radical-generating photosensitizer. Pharmaceutical application of **fullerene** to cancer photo-dynamic therapy appears promising.

ACCESSION NUMBER: 2000:65696 CAPLUS  
DOCUMENT NUMBER: 133:28055  
TITLE: Biological activity of photoexcited **fullerene**  
AUTHOR(S): Yamakoshi, Yoko; Sueyoshi, Shoko; Miyata, Naoki  
CORPORATE SOURCE: Natl. Inst. Health Sci. Tokyo, Kamiyoga 1-18-1, Setagaya-ku, Tokyo, 158-8501, Japan  
SOURCE: Kokuritsu Iyakuhiin Shokuhin Eisei Kenkyusho Hokoku (1999), 117, 50-62  
CODEN: KISHFC; ISSN: 1343-4292  
PUBLISHER: Kokuritsu Iyakuhiin Shokuhin Eisei Kenkyusho Kagaku Busshitsu Johobu  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Japanese

L5 ANSWER 15 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 53 refs. Biol. activity of photo induced fullerenes was reviewed on **DNA**, enzymes, lipids, microsomes, cell membranes, mutagen activity, cytotoxicity, anticancer activity, antiviral activity, initiation activity of carcinogenesis, antibacterial activity, etc. for photodynamic therapy.

ACCESSION NUMBER: 2000:65612 CAPLUS  
DOCUMENT NUMBER: 132:177450  
TITLE: Chemistry of **fullerene**. Biological activity under photoirradiation  
AUTHOR(S): Yamakoshi, Yoko; Miyata, Naoki  
CORPORATE SOURCE: Natl. Inst. Health Sci., Japan  
SOURCE: Kikan Kagaku Sosetsu (1999), 43(Furaren no Kagaku), 214-223  
CODEN: KKSOEC  
PUBLISHER: Nippon Kagakkai  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Japanese

L5 ANSWER 16 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review, with 32 refs., is given on (1) the syntheses and the properties of several fullerenes having functional groups, (2) water sol. **fullerene** deriv. and **fullerene**-nucleotide conjugate which exhibit biol. activities under illumination, (3) metal complexes with of C60 and C70 bonded in an  $\eta^5$  manner by a 5 membered ring of the **fullerene**.

ACCESSION NUMBER: 2000:65606 CAPLUS  
DOCUMENT NUMBER: 133:17502  
TITLE: Chemistry of **fullerene**. Reaction of **fullerene**. Design and synthesis of

AUTHOR(S): organofullerenes  
CORPORATE SOURCE: Nakamura, Eiichi; Sawamura, Masaya; Isobe, Hiroyuki  
SOURCE: Grad. Sch. Sci., The Univ. Tokyo, Japan  
Kikan Kagaku Sosetsu (1999), 43(Furaren no Kagaku),  
165-171  
CODEN: KKSOEC  
PUBLISHER: Nippon Kagakkai  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Japanese

L5 ANSWER 17 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 34 refs. on biol. effect of sol. C60 and C60 derivs.  
including: inhibition effect on enzyme activity, selective splice on  
**DNA**, effect on cell growth, mechanism of C60 function, and their  
possible applications.

ACCESSION NUMBER: 2000:32226 CAPLUS  
DOCUMENT NUMBER: 132:248782  
TITLE: Biological effect of soluble C60 and C60 derivatives  
AUTHOR(S): Yang, Xinlin; Cheng, Fuyong; Zhu, Hesun  
CORPORATE SOURCE: Beijing University of Science and Technology,  
Beijing,  
100081, Peop. Rep. China  
SOURCE: Xibao Shengwuxue Zazhi (1999), 21(4), 173-177  
CODEN: XISZD3; ISSN: 0253-9977  
PUBLISHER: Shanghai Kexue Jishu Chubanshe  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Chinese

L5 ANSWER 18 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB This document discloses a novel means for **DNA** compaction.  
**Fullerene** derivs. having 1 to 4 nitrogen-contg. hydrophilic side  
chains or salts thereof are to be used in the above means. A  
**fullerene** deriv. was prepd. and tested using calf thymus  
**DNA** and ethidium bromide.

ACCESSION NUMBER: 1999:595122 CAPLUS  
DOCUMENT NUMBER: 131:237139  
TITLE: **Fullerene** derivatives for potential use in  
gene therapy  
INVENTOR(S): Nakamura, Eiichi; Sawamura, Masaya; Isobe, Hiroyuki  
PATENT ASSIGNEE(S): Fujisawa Pharmaceutical Co., Ltd., Japan  
SOURCE: PCT Int. Appl., 37 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9946235	A1	19990916	WO 1999-JP1146	19990310
W: JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1069107	A1	20010117	EP 1999-907890	19990310
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, PT, IE, FI				
PRIORITY APPLN. INFO.:			JP 1998-58614	19980310
			WO 1999-JP1146	19990310
OTHER SOURCE(S):			MARPAT 131:237139	
REFERENCE COUNT:			4	
REFERENCE(S):			(1) Friedman, S; J Am Chem Soc 1993, V115(15), P6506 CAPLUS	
			(2) Nakamura, E; Bull Chem Soc Jpn 1996, V69(8),	

P2143

CAPLUS

- (3) The Regents Of The University Of California; US  
5811460 A CAPLUS  
(4) The Regents Of The University Of California; WO  
9519949 A1 1995 CAPLUS

L5 ANSWER 19 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review, with .apprx.47 refs., is given which documents the exceptional range of research avenues in supramol. **fullerene** chem. that were pursued during the past decade. It illustrates how mol. complexation of pristine fullerenes developed from solid state enclathration by .pi.-electron-rich compds. to inclusion complexation by designed macrocyclic receptors in the liq. phase. Progress in covalent **fullerene** functionalization led to the development of spectacular supramol. architectures including rotaxanes, catenanes, **DNA** complexes, diads and triads for photoinduced electron and energy transfer and ordered thin films. All of these mol. assemblies and supramol.

arrays

feature distinct properties as a consequence of the presence of the **fullerene** components. Recent investigations hinting at potential technol. applications of supramol. **fullerene**, such as in sensorics, are highlighted.

ACCESSION NUMBER: 1999:561019 CAPLUS

DOCUMENT NUMBER: 131:345584

TITLE: Supramolecular **fullerene** chemistry

AUTHOR(S): Diederich, Francois; Gomez-Lopez, Marcos

CORPORATE SOURCE: Laboratorium fur Organische Chemie, ETH Zentrum, Zurich, Switz.

SOURCE: Chem. Soc. Rev. (1999), 28(5), 263-277

CODEN: CSRVBR; ISSN: 0306-0012

PUBLISHER: Royal Society of Chemistry

DOCUMENT TYPE: Journal; General Review.

LANGUAGE: English

REFERENCE COUNT: 56

REFERENCE(S): (1) Andersson, T; J Chem Soc Chem Commun 1992, P604 CAPLUS

(2) Arias, F; J Am Chem Soc 1996, V118, P6086 CAPLUS

(3) Armaroli, N; Chem Eur J 1998, V4, P406 CAPLUS

(4) Armaroli, N; New J Chem 1999, P77 CAPLUS

(5) Ashton, P; Angew Chem Int Ed Engl 1997, V36,

P1448

CAPLUS

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 20 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A new water-sol., cationic homooxacalix[3]arene was synthesized: this homooxacalix[3]arene solubilized [60]**fullerene** into water and the [60]**fullerene**-homooxacalix[3]arene complex acted as an efficient **DNA** photocleavage reagent.

ACCESSION NUMBER: 1999:447131 CAPLUS

DOCUMENT NUMBER: 131:283338

TITLE: Water-soluble [60]**fullerene**-cationic homooxacalix[3]arene complex which is applicable to the photocleavage of **DNA**

AUTHOR(S): Ikeda, Atsushi; Hatano, Tsukasa; Kawaguchi, Masaru; Shinkai, Seiji; Suenaga, Hikaru

CORPORATE SOURCE: Department of Chemistry and Biochemistry, Graduate School of Engineering, Kyushu Univ., Fukuoka, Japan

SOURCE: Chem. Commun. (Cambridge) (1999), (15), 1403-1404

CODEN: CHCOFS; ISSN: 1359-7345

PUBLISHER: Royal Society of Chemistry

DOCUMENT TYPE: Journal

LANGUAGE: English

REFERENCE COUNT: 20

REFERENCE(S): (1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS

(3) Arbogast, J; J Phys Chem 1991, V95, P11 CAPLUS

(4) Bernstein, R; J Am Chem Soc 1999, V121, P464  
CAPLUS  
(6) Friedman, S; J Am Chem Soc 1993, V115, P6506  
CAPLUS  
(7) Friedman, S; J Med Chem 1998, V41, P2424 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

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L5 ANSWER 21 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Unavailable

ACCESSION NUMBER: 1999:446849 CAPLUS

TITLE: Photo-induced **DNA** cleavage by water-soluble  
cationic **fullerene** derivatives

AUTHOR(S): Anon.

SOURCE: Chem. Lett. (1999), (7), 713  
CODEN: CMLTAG; ISSN: 0366-7022

PUBLISHER: Chemical Society of Japan

DOCUMENT TYPE: Journal; Errata

LANGUAGE: English

L5 ANSWER 22 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The mechanism for apoptosis induction during the implantation of renal  
transplants or ischemia/reperfusion (I/R) injury might be related to the  
release of free radicals. Hexa(sulfobutyl)**fullerene**, a strong  
free radical scavenger, is an isomeric mixt. of polyfunctional C60 deriv.  
carrying six sulfobutyl groups. To elucidate the role of  
hexa(sulfobutyl)

**fullerene** in the I/R induced renal damage of the rat kidneys, we  
used TUNEL, **DNA** laddering, quant. PCR and western blot to  
evaluate the expression of apoptosis. We found that less apoptotic  
expression and up-regulation in bcl-xL, an anti-death gene, was found in  
the damaged kidneys with hexa(sulfobutyl)**fullerene** (100 .mu. g)  
pretreatment. It is suggested that the mechanism for hexa(sulfobutyl)  
**fullerene** attenuating I/R induced apoptosis in the rat kidney may  
be ascribed to the overexpression of bcl-xL.

ACCESSION NUMBER: 1999:440827 CAPLUS

DOCUMENT NUMBER: 131:208892

TITLE: Novel water-soluble hexa(sulfobutyl)**fullerene**  
attenuates apoptosis formation after ischemic renal  
failure

AUTHOR(S): Chien, Chiang-Ting; Chen, Chau-Fong; Chiang, Long Y.;  
Lai, Ming-Kuen

CORPORATE SOURCE: Departments of Clinical Research, National Taiwan  
University College of Medicine, Taipei, Taiwan

SOURCE: Fullerene Sci. Technol. (1999), 7(4), 529-540  
CODEN: FTECEG; ISSN: 1064-122X

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

REFERENCE COUNT: 19

REFERENCE(S): (2) Bissonnette, R; Nature 1992, V359, P552 CAPLUS  
(3) Boise, L; Cell 1993, V74, P597 CAPLUS  
(5) Chiang, L; J Chem Soc Chem Commun 1995, P1283  
CAPLUS  
(7) Chueh, S; Transplant Proc 1997, V29, P1313 CAPLUS  
(8) Facchinetti, A; J Immunol Methods 1991, V136,

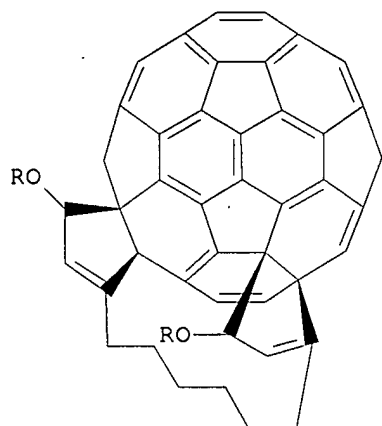
P125

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L5 ANSWER 23 OF 60 CAPLUS COPYRIGHT 2001 ACS

GI



I

AB Much interest in the biol. activities of fullerenes have been drawn since their first discovery. As one of the first findings of biol. activities, we have already reported the synthesis of water-miscible **fullerene** carboxylic acid and its biol. activities. Thus, we found that fullerenes show the photo-induced **DNA** cleaving activity, cytotoxicity and enzyme inhibition. In this study, we further investigated their biol. activities, including distribution anal. of dosed radio-active **fullerene** and interactions with DNAs. We have synthesized radio-active water-miscible **fullerene** carboxylic acid by [3 + 2] cycloaddn. of trimethylene methane. When administered orally to rats, **fullerene** was not efficiently absorbed and was excreted primarily in the feces. When injected i.v., it was distributed rapidly to various tissues, and most of the material was retained in the body after one week.

We have expanded **fullerene**'s photo-induced biol. activities, targeting DNAs. Thus, we have designed and synthesized a novel **fullerene**-oligonucleotide conjugate, and examd. its **DNA** nicking ability. When this conjugate was incubated and irradiated with oligonucleotides with target sequence, site specific nicking of the oligonucleotide was achieved. We further continued investigating the interactions of **fullerene** with DNAs and found that **fullerene**-polyamine [I; R = COCH<sub>2</sub>NMe(CH<sub>2</sub>)<sub>3</sub>NMe<sub>2</sub>] conjugate tightly binds to **DNA** in a non-specific manner, and this new **fullerene** gave first example of photo-induced covalent bond formation of **fullerene** with **DNA** base.

ACCESSION NUMBER: 1999:285374 CAPLUS  
 DOCUMENT NUMBER: 131:18823  
 TITLE: Synthesis and functions of a novel **DNA** binding **fullerene**  
 AUTHOR(S): Isobe, Hiroyuki; Sawamura, Masaya; Sugiyama, Sho; Fukui, Ken-ich; Iwasawa, Yasuhiro; Nakamura, Eiichi  
 CORPORATE SOURCE: Department of Chemistry, The University of Tokyo, Japan  
 SOURCE: Tennen Yuki Kagobutsu Toronkai Koen Yoshishu (1998), 40th, 157-161  
 CODEN: TYKYDS  
 PUBLISHER: Nippon Kagakkai  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Japanese

L5 ANSWER 24 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Repeated application of buckminsterfullerene (C<sub>60</sub>) toluene soln. combined with UVA radiation onto hairless mouse back skin resulted in enhancing

formation of erythema as an acute disease but induced no carcinoma on the skin. This result is probably due to inactivation of C60 in the living cells to generate little singlet oxygen  $^1O_2$  by UVA radiation.

ACCESSION NUMBER: 1999:264942 CAPLUS  
DOCUMENT NUMBER: 131:41564  
TITLE: Effect of repeated application of C60 combined with UVA radiation onto hairless mouse back skin  
AUTHOR(S): Moriguchi, Takeshi; Yano, Kazuyuki; Hokari, Shigeru; Sonoda, Masaru  
CORPORATE SOURCE: Department of Chemistry, Saitama Medical School, Saitama, 350-0496, Japan  
SOURCE: Fullerene Sci. Technol. (1999), 7(2), 195-209  
CODEN: FTECEG; ISSN: 1064-122X  
PUBLISHER: Marcel Dekker, Inc.  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
REFERENCE COUNT: 33  
REFERENCE(S):  
(1) Arbogast, J; J Phys Chem 1991, V95, P11 CAPLUS  
(3) Dall'Acqua, F; Biochim Biophys Acta 1974, V353, P267 CAPLUS  
(4) DeGrazia, H; Nucleic Acids Res 1985, V13, P7483 CAPLUS  
(8) Foote, C; Free Radicals in Biology Vol II 1976, P85 CAPLUS  
(9) Grube, D; Photochem Photobiol 1977, V25, P269 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 25 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB **Fullerene** derivs. 1a-c cleaved double stranded **DNA** under photo-irradn. through the action of singlet oxygen generated by the reaction of the photo-excited fullerenes with oxygen. The photolysis in conventional aq. soln. was more effective than that in the presence of

PVP

or .gamma.-cyclodextrin.

ACCESSION NUMBER: 1999:258756 CAPLUS  
DOCUMENT NUMBER: 131:41556  
TITLE: Photo-induced **DNA** cleavage by water-soluble cationic **fullerene** derivatives  
AUTHOR(S): Takenaka, Shigeori; Yamashita, Kenichi; Takagi, Makoto; Hatta, Taizo; Tsuge, Otohiko  
CORPORATE SOURCE: Department of Chemical Systems and Engineering, Kyushu University, Fukuoka, 812-8581, Japan  
SOURCE: Chem. Lett. (1999), (4), 321-322  
CODEN: CMLTAG; ISSN: 0366-7022  
PUBLISHER: Chemical Society of Japan  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
REFERENCE COUNT: 8  
REFERENCE(S):  
(1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS  
(2) Andersson, T; J Chem Soc Commun V1992, P604  
(4) Rodgers, M; J Am Chem Soc 1983, V105, P6201  
CAPLUS  
(6) Tokuyama, H; J Am Chem Soc 1993, V115, P7918 CAPLUS  
(7) Yamakoshi, Y; J Org Chem 1996, V61, P7236 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 26 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Water sol. cationic **fullerene** derivs. bind to calf thymus **DNA** due to the electrostatic interactions at the phosphate anion sites and the hydrophobic interactions in the grooves.

ACCESSION NUMBER: 1999:258755 CAPLUS  
DOCUMENT NUMBER: 131:69816



TITLE: Study of the DNA interaction with water-soluble cationic fullerene derivatives  
 AUTHOR(S): Takenaka, Shigeori; Yamashita, Kenichi; Takagi, Makoto; Hatta, Taizo; Tanaka, Atsuo; Tsuge, Otohiko  
 CORPORATE SOURCE: Department of Chemical Systems and Engineering, Kyushu University, Fukuoka, 812-8581, Japan  
 SOURCE: Chem. Lett. (1999), (4), 319-320  
 CODEN: CMLTAG; ISSN: 0366-7022  
 PUBLISHER: Chemical Society of Japan  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 REFERENCE COUNT: 8  
 REFERENCE(S): (1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS  
 (3) Carter, M; J Am Chem Soc 1989, V111, P8901 CAPLUS  
 (5) Prato, M; Tetrahedron 1996, V52, P5221 CAPLUS  
 (6) Tokuyama, H; J Am Chem Soc 1993, V115, P7918 CAPLUS  
 (7) Yamakoshi, Y; J Org Chem 1996, V61, P7236 CAPLUS  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 27 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Graphitic nanotubes, which include tubular fullerenes (commonly called "buckytubes") and fibrils, which are functionalized by chem. substitution,

are used as solid supports in electrogenerated chemiluminescence assays. The graphitic nanotubes are chem. modified with functional group biomols. prior to use in an assay. Assocn. of electrochemiluminescent ruthenium complexes with the functional group biomol.-modified nanotubes permits detection of mols. including nucleic acids, antigens, enzymes, and enzyme substrates by multiple formats.

ACCESSION NUMBER: 1999:100743 CAPLUS  
 DOCUMENT NUMBER: 130:121849  
 TITLE: Graphitic nanotubes in luminescence assays  
 INVENTOR(S): Massey, Richard J.; Martin, Mark T.; Dong, Liwen; Lu, Ming; Fischer, Alan; Jameison, Fabian; Liang, Pam; Hoch, Robert; Leland, Jonathan K.  
 PATENT ASSIGNEE(S): Meso Scale Technology, USA  
 SOURCE: U.S., 42 pp., Cont.-in-part of U.S. Ser. No. 352,400.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 3  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5866434	A	19990202	US 1996-611347	19960306
CA 2207282	AA	19960613	CA 1995-2207282	19951208
CA 2248893	AA	19970912	CA 1997-2248893	19970305
WO 9733176	A1	19970912	WO 1997-US3653	19970305
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
AU 9720737	A1	19970922	AU 1997-20737	19970305
AU 724509	B2	20000921		
EP 885393	A1	19981223	EP 1997-908967	19970305
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
CN 1217791	A	19990526	CN 1997-194334	19970305

PRIORITY APPL. INFO.:

US 1994-352400 19941208  
US 96-611347 19960306  
WO 1997-US3653 19970305

REFERENCE COUNT:

4

REFERENCE(S):

- (1) Kampe; US 5554751 1996 CAPLUS
- (2) Keana; US 5582955 1996 CAPLUS
- (3) Richmond; US 5310669 1994 CAPLUS
- (4) Ruoff; US 5547748 1996

L5 ANSWER 28 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Electrochem. behavior of **DNA** at C60:.gamma.-cyclodextrin (C60:.gamma.-CD) and Nafion chem. modified electrodes in aq. soln. was investigated. It was found that C60:.gamma.-CD is capable of mediating the electron transfer to **DNA**, showing two-way electrocatalytic activity toward **DNA**. (c) 1999 Academic Press.

ACCESSION NUMBER: 1999:100051 CAPLUS

DOCUMENT NUMBER: 130:322556

TITLE: Electrocatalysis of **DNA** at C60:.gamma.-Cyclodextrin and Nafion Chemically Modified Electrodes

AUTHOR(S): Li, Mei-Xian; Li, Nan-Qiang; Gu, Zhen-Nan; Zhou, Xi-Huang; Sun, Yi-Liang; Wu, Yong-Qing

CORPORATE SOURCE: Department of Chemistry, Peking University, Beijing, 100871, Peop. Rep. China

SOURCE: Microchem. J. (1999), 61(1), 32-39

CODEN: MICJAN; ISSN: 0026-265X

PUBLISHER: Academic Press

DOCUMENT TYPE: Journal

LANGUAGE: English

REFERENCE COUNT: 25

- REFERENCE(S):
- (1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS
  - (2) Andersson, T; J Chem Soc Chem Commun 1992, P604 CAPLUS
  - (3) Andrieux, C; J Electroanal Chem 1982, V142, P1 CAPLUS
  - (4) Boulas, P; J Phys Chem 1994, V98, P1282 CAPLUS
  - (5) Braun, T; Solid State Ionics 1994, V74, P47

CAPLUS

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 29 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Fullerenes and dihydro-fullerenes are electron-poor photosensitizers, and **DNA** photo-cleavage (selective for G) mediated by these compds. has been reported. Two possible mechanisms, involving electron transfer from G to **fullerene** (type 1), or singlet oxygen ( $^1O_2$ ) generated by the **fullerene** as the active oxidant (type 2), have been proposed. The authors report the first detection of electron transfer from a guanosine deriv. to C60, and show that an 8-oxo-guanosine deriv.

is

far more reactive under the same conditions. They conclude that, for an isolated G in a **DNA** strand, type 2 oxidn. is the expected mechanism, while for GG stacks, the most likely mechanism is type 1.

ACCESSION NUMBER: 1998:812109 CAPLUS

DOCUMENT NUMBER: 130:168595

TITLE: On the Mechanism of **DNA** Cleavage by Fullerenes Investigated in Model Systems: Electron Transfer from Guanosine and 8-Oxo-Guanosine Derivatives to C60

AUTHOR(S): Bernstein, Robert; Prat, Ferran; Foote, Christopher S.

CORPORATE SOURCE: Department of Chemistry Biochemistry, University of California, Los Angeles, CA, 90095-1569, USA

SOURCE: J. Am. Chem. Soc. (1999), 121(2), 464-465

CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE:  
LANGUAGE:  
REFERENCE COUNT:  
REFERENCE(S):

Journal  
English  
29

- (1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS
- (2) Anderson, J; J Am Chem Soc 1994, V116, P9763 CAPLUS
- (5) Arbogast, J; J Am Chem Soc 1992, V114, P2277 CAPLUS
- (6) Arbogast, J; J Phys Chem 1991, V95, P11 CAPLUS
- (7) Armitage, B; J Am Chem Soc 1994, V116, P9847 CAPLUS

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 30 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A mechanism was studied of photoinduced **DNA** cleavage by C60 and C70 fullerenes in the presence of NADH. The reaction mechanism included electron transfer from NADH to photoexcited fullerenes, and then from **fullerene** anion radicals to O2 to generate oxyl radicals O2.bul.- and OH, which are the ultimate active species for **DNA** cleavage. Photogeneration of O2.bul.- and OH radicals in the photolysis of aq. C60 and C70 fullerenes was confirmed by ESR using DMPO spin trap. The authors

obsd. formation of these oxyl radicals even at low NADH concn. of 0.08 mM,

which indicates that the reductive activation of O2 by photoexcited fullerenes should be possible under physiol. conditions.

ACCESSION NUMBER: 1998:729083 CAPLUS

DOCUMENT NUMBER: 130:88016

TITLE: .bul.OH and O2.bul.- Generation in Aqueous C60 and C70

AUTHOR(S): Solutions by Photoirradiation: An EPR Study  
Yamakoshi, Yoko; Sueyoshi, Shoko; Fukuhara, Kiyoshi;  
Miyata, Naoki; Masumizu, Toshiki; Kohnno, Masahiro  
CORPORATE SOURCE: Division of Organic Chemistry, National Institute of  
Health Sciences, Tokyo, 158-8501, Japan  
SOURCE: J. Am. Chem. Soc. (1998), 120(47), 12363-12364  
CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

REFERENCE COUNT: 35

- REFERENCE(S):
- (1) An, Y; Tetrahedron 1996, V52, P5179 CAPLUS
  - (2) Arbogast, J; J Am Chem Soc 1991, V113, P8886 CAPLUS
  - (3) Arbogast, J; J Am Chem Soc 1992, V114, P2277 CAPLUS
  - (4) Arbogast, J; J Phys Chem 1991, V95, P11 CAPLUS
  - (6) Brezova, V; J Phys Chem 1995, V99, P16234 CAPLUS
- ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d 15 31-40 abs ibib

L5 ANSWER 31 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The photodynamic effects of **fullerene** (C60) on the calf thymus **DNA** with FT-Raman spectroscopy at the mol. level were studied in this paper. The spectrum showed that the photoexcited C60 damaged almost all of the component groups of **DNA** to different extents. The conformation of **DNA** has been changed considerably by weakening the bases stacking and hydrogen bond, meanwhile the adenine and guanine were destroyed greatly. With increasing the concn., C60 induced a cleavage of the **DNA** stand by damaging the phosphate backbone and deoxyribose. The photodynamic damage to **DNA** by photoexcited C60 was induced from singlet oxygen (1O2) and .OH, O2.-.

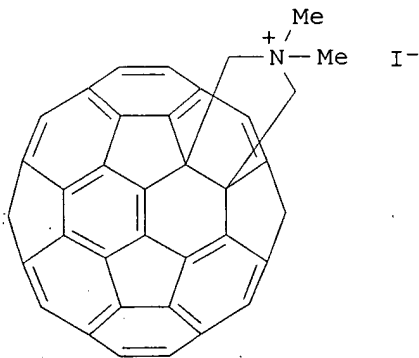
ACCESSION NUMBER: 1998:662844 CAPLUS  
 DOCUMENT NUMBER: 130:49274  
 TITLE: Studies of the photodynamic effects of  
 fullerene (C60) on DNA by FT-Raman  
 spectroscopy  
 AUTHOR(S): Yan, Qingfeng; Qian, Kaixian; Li, Wenzhu  
 CORPORATE SOURCE: Department of Biological Science and Biotechnology,  
 Zhejiang University, Hangzhou, 310027, Peop. Rep.  
 China  
 SOURCE: Zhongguo Jiguang (1998), A25(7), 661-666  
 CODEN: ZHJIDO; ISSN: 0258-7025  
 PUBLISHER: Kexue Chubanshe  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Chinese

L5 ANSWER 32 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 57 refs. Although emission spectroscopy is common in the  
 visible and UV regions, the technique was neglected in the IR and far IR.  
 Fourier transform emission spectra of IR electronic transitions,  
 vibration-rotation bands and pure rotational transitions will be  
 presented. The mols. of interest range from diat. such as LiH and FeF to  
 large mols. such as polycyclic arom. hydrocarbons (PAHs), C60 and  
 DNA bases. Even at long wavelengths in the far IR region  
 excellent spectra of hot mols. could be recorded. One of the primary  
 applications of lab. emission spectra was the assignment of astronomical  
 spectra of objects such as the sun, sunspots, C stars and planetary  
 nebulas. The discovery of hot H2O vapor in sunspots and the origin of  
 the unidentified IR emission bands is discussed. Finally, some spectra  
 obtained with a cryogenic IR echelle spectrograph will be compared with  
 spectra from a Fourier transform spectrometer.

ACCESSION NUMBER: 1998:475759 CAPLUS  
 DOCUMENT NUMBER: 129:307810  
 TITLE: Emission spectroscopy and molecular astronomy  
 AUTHOR(S): Bernath, P. F.  
 CORPORATE SOURCE: Department of Chemistry, University of Waterloo,  
 Waterloo, ON, N2L 3G1, Can.  
 SOURCE: AIP Conf. Proc. (1998), 430(Fourier Transform  
 Spectroscopy), 23-27  
 CODEN: APCPCS; ISSN: 0094-243X  
 PUBLISHER: American Institute of Physics  
 DOCUMENT TYPE: Journal; General Review  
 LANGUAGE: English

L5 ANSWER 33 OF 60 CAPLUS COPYRIGHT 2001 ACS  
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AB The authors report here a new and facile route to nanostructures

constructed from **DNA/fullerene** hybrids that can be rapidly imaged using transmission electron microscopy (TEM). C60-N,N-dimethylpyrrolidinium iodide (I) was synthesized to serve as the complexing agent. Mol. modeling indicated that the complexation of iodine-free I along successive phosphate groups of a **DNA** backbone is sterically permitted and that the thickness of the double-stranded **DNA**/iodine-free I would be 5-6 nm. **DNA**/iodine-free I complexes were then prepd. by mixing the **DNA** soln. with a soln. of I in DMSO. Indeed, the hybrid **DNA/fullerene**-based nanoarchitectures were easily imaged by TEM without heavy metal. The excellent contrast was obtained between the complexed **DNA** and the carbon film background. Initially, vast amt. of aggregation and possible supercoiling hindered the authors from measuring the length and diameter of individual plasmids. Use of certain surfactants segregated complexes which were in a condensed form and the plasmids retained a contorted circular shape. **DNA** can be used as a framework for the assembly of **fullerene** materials through electrostatic interactions with phosphate groups along the **DNA** backbone. Since exhaustive substitution on the phosphate moieties could not be verified, the **DNA/fullerene** complexes described here are not assured of a precise structure. However, this method provides a rapid one-step route to hybrid nanoarchitectures in size regimes inaccessible by traditional synthetic methods.

ACCESSION NUMBER: 1998:429390 CAPLUS  
DOCUMENT NUMBER: 129:203193  
TITLE: Assembly of **DNA/fullerene** hybrid materials  
AUTHOR(S): Cassell, Alan M.; Scrivens, Walter A.; Tour, James M.  
CORPORATE SOURCE: Dep. Chem. and Biochem., Univ. South Carolina, Columbia, SC, 29208, USA  
SOURCE: Angew. Chem., Int. Ed. (1998), 37(11), 1528-1531  
CODEN: ACIEF5; ISSN: 1433-7851  
PUBLISHER: Wiley-VCH Verlag GmbH  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 34 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Electrochem. behavior of C60-.gamma.-cyclodextrin (1:1)/Nafion and C60-.gamma.-cyclodextrin (1:2)/Nafion chem. modified electrodes has been studied in an aq. soln. A couple of reversible surface-confined one-electron-transfer electroredn. waves were detected by cyclic voltammetry. When scanning between -0.20 and -0.80 V, expts. indicate that the chem. modified electrodes have good stability and reproducibility. It is found that the chem. modified electrodes have electrocatalytic activity to some biomols. such as Hb, cytochrome c, hemin and **DNA** in the medium of 0.10 mol/L KCl.

ACCESSION NUMBER: 1998:425061 CAPLUS  
DOCUMENT NUMBER: 129:172639  
TITLE: Electrocatalytic behavior of some biomolecules at C60-.gamma.-cyclodextrin/Nafion chemically modified electrodes  
AUTHOR(S): Li, Meixian; Li, Nanqiang; Gu, Zhennan; Zhou, Xihuang;  
Sun, Yiliang; Wu, Yongqing  
CORPORATE SOURCE: Dep. of Chemistry, Peking University, Beijing, 100871, Peop. Rep. China  
SOURCE: Fenxi Huaxue (1998), 26(6), 698-702  
CODEN: FHHDT; ISSN: 0253-3820  
PUBLISHER: Zhongguo Huaxuehui "Fenxi Huaxue" Bianji Weiyuanhui  
DOCUMENT TYPE: Journal  
LANGUAGE: Chinese

L5 ANSWER 35 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 23 refs. The biol. activities of fullerenes and their derivs. have been recognized since early in this decade. The preliminary research indicates that they have the unique performances in anti-HIV activity, enzyme inhibition, **DNA** cleavage, photodynamic therapy, and they will be widely applied in biochem., medicine, and pharmaceuticals.

ACCESSION NUMBER: 1998:399419 CAPLUS  
DOCUMENT NUMBER: 129:89740  
TITLE: Progress in research on the biological activities of fullerenes  
AUTHOR(S): Xu, Zheng; Suo, Zhi-yong; Wei, Xian-wen; Zhu, De-xu  
CORPORATE SOURCE: Coordination Chemistry Institute, Nanjing University, Nanjing, 210093, Peop. Rep. China  
SOURCE: Shengwu Huaxue Yu Shengwu Wuli Jinzhan (1998), 25(2), 130-135  
CODEN: SHYCD4; ISSN: 1000-3282  
PUBLISHER: Kexue Chubanshe  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Chinese

L5 ANSWER 36 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Examn. was made in this study of the biol. action of [60]**fullerene** (C60) under photoirradn. Photoexcited C60, solubilized with poly(vinylpyrrolidone) (PVP), showed mutagenicity, lipid peroxidn. and **DNA**-damage such as 8-OH-dG formation and **DNA**-strand scission. Photosensitization is a prominent feature of C60 and thus the above effects may be considered due to active oxygen species generated by photoexcited C60. Mol. mechanisms for the biol. action are discussed.

ACCESSION NUMBER: 1998:273251 CAPLUS  
DOCUMENT NUMBER: 129:50718  
TITLE: Biological action of [60]**fullerene** under photoirradiation  
AUTHOR(S): Miyata, Naoki; Yamakoshi, Yoko  
CORPORATE SOURCE: Division of Organic Chemistry, National Institute of Health Sciences, Tokyo, 158, Japan  
SOURCE: Proc. - Electrochem. Soc. (1997), 97-42 (Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials, Vol. 5), 345-357  
CODEN: PESODO; ISSN: 0161-6374  
PUBLISHER: Electrochemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 37 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A nucleophilic (sulfhydryl or amino) group was introduced at the 3'- or 5'-terminus of an oligonucleotide. C60-Buckminsterfullerene bearing an alkylating or carboxyl group was attached to the modified oligonucleotide via alkylation or acylation of nucleophilic residue. The conjugate was purified by electrophoresis in agarose. Electrophoretic mobility, UV-spectra and electron microscopy studies indicated that the conjugate

in

water soln. formed aggregates of a size ranging from several tens to several hundreds of nanometers. Nevertheless, the conjugate of an oligonucleotide 14-mer TTCTTCTCCTTTCT formed a duplex with the complementary **DNA** sequence and triplexes with corresponding double-stranded DNAs. As it was shown with three different target oligonucleotides, the light-induced guanine-specific cleavage of targets was obsd. in the expected region of the **fullerene** moiety location. The **fullerene**-oligonucleotide conjugate is adsorbed on the surface of poly(alkylcyanoacrylate) nanoparticles without cationic lipids due to hydrophobic interactions between **fullerene** moiety and poly(alkylcyanoacrylate) matrix. Direct interaction of **fullerene** - anti-luciferase oligonucleotide conjugate with J.Jian Jurkat cells expressing luciferase was studied. The antisense biol. activity of the conjugate did not exceed that of the non-conjugated oligonucleotide, even when the conjugate was adsorbed on the hydrophobic

nanoparticles.

ACCESSION NUMBER: 1998:273233 CAPLUS  
DOCUMENT NUMBER: 129:50961  
TITLE: **Fullerene**-oligonucleotide conjugates:  
photoinduced sequence-specific **DNA** cleavage,  
interaction with poly(alkylcyanoacrylate)  
nanoparticles and biological activity  
AUTHOR(S): Boutorine, A. S.; Balland, O.; Tokuyama, H.;  
Takasugi, M.; Isobe, H.; Nakamura, E.; Helene, C.  
CORPORATE SOURCE: Laboratoire de Biophysique, INSERM U201 - CNRS  
URA481,  
Museum National d'Histoire Naturelle, Paris, Fr.  
SOURCE: Proc. - Electrochem. Soc. (1997), 97-42 (Recent  
Advances in the Chemistry and Physics of Fullerenes  
and Related Materials, Vol. 5), 186-196  
CODEN: PESODO; ISSN: 0161-6374  
PUBLISHER: Electrochemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 38 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A cationic, self-assembled monolayer on gold substrate can immobilize  
**DNA** without impairing its native structure; the site-specific  
photocleavage of the **DNA** is achieved by incorporation of [60]  
**fullerene** into the monolayer.

ACCESSION NUMBER: 1997:589453 CAPLUS  
DOCUMENT NUMBER: 127:245133  
TITLE: Immobilization and cleavage of **DNA** at  
cationic, self-assembled monolayers containing C60 on  
gold  
AUTHOR(S): Higashi, Nobuyuki; Inoue, Takayo; Niwa, Masazo  
CORPORATE SOURCE: Department of Molecular Science & Technology, Faculty  
of Engineering, Doshisha University, Kyotanabe,  
610-03, Japan  
SOURCE: Chem. Commun. (Cambridge) (1997); (16), 1507-1508  
CODEN: CHCOFS; ISSN: 1359-7345  
PUBLISHER: Royal Society of Chemistry  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 39 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The last sentence in the left column of p. 7237 and the corresponding  
ref.  
is cor.

ACCESSION NUMBER: 1997:416740 CAPLUS  
DOCUMENT NUMBER: 127:135711  
TITLE: Acridine Adduct of [60]**Fullerene** with  
Enhanced **DNA** Cleaving-Activity. [Erratum to  
document cited in CA125:328484]  
AUTHOR(S): Yamakoshi, Yoko Nakajima; Yagami, Takeshi; Sueyoshi,  
Shoko; Miyata, Naoki  
CORPORATE SOURCE: Division of Organic Chemistry, National Institute of  
Health Sciences, Setagaya, 158, Japan  
SOURCE: J. Org. Chem. (1997), 62(14), 4885  
CODEN: JOCEAH; ISSN: 0022-3263  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 40 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB **Fullerene** C60 dissolved in polyvinylpyrrolidone was mutagenic  
for Salmonella strains TA102, TA104 and YG3003 in the presence of rat  
liver microsomes when it was irradiated by visible light. The  
mutagenicity was elevated in strain YG3003, a repair enzyme-deficient

mutant of TA102. The mutation was reduced in the presence of .beta.-otene and p-bromophenacyl bromide, a scavenger and an inhibitor, resp., of phospholipase. The results suggest that singlet oxygen was generated by irradiating the C60 by visible light and that the mutagenicity was due to oxidized phospholipids in rat liver microsomes. Of the phospholipids in rat liver microsomes, the linoleate fraction isolated by high performance liq. chromatog. was a major component, and played an important role in mutagenicity. Me linoleate, which was prepd. for gas chromatog. anal., was readily oxidized to hydroperoxymethyl linoleate, and assocd. with both 10- and 12-hydroxyl derivs. with a double bond in chem. structure by singlet oxygen: radicals to the hydroxyl function were probably generated. Because of the instability of the hydroxymethyl linoleate radicals, guanine residues generated radicals. The results of ESR spectrum anal. suggested generation of radicals at the guanine base but not thymine, cytosine and adenine bases as estd. with the g value of 2.0150. The singlet oxygen-generating C60 formed 8-hydroxydeoxyguanosine (8-OH-dG) upon treatment with 2'-deoxyguanosine and microsomes or linoleate. The formation of 8-OH-dG was highly elevated in the presence of microsomes and linoleate. The level of 8-OH-dG formed with and without the microsome fraction was 47 and 9.6 units, resp., per 104 deoxyguanosine. It was considered that the mechanism is indirect action of singlet oxygen due to lipid peroxidn. of linoleate that causes oxidative DNA damage.

ACCESSION NUMBER: 1996:676234 CAPLUS  
DOCUMENT NUMBER: 125:320295  
TITLE: Mutagenicity of the fullerene C60-generated singlet oxygen dependent formation of lipid peroxides  
AUTHOR(S): Sera, Nobuyuki; Tokiwa, Hiroshi; Miyata, Naoki  
CORPORATE SOURCE: Fukuoka Inst. of Health and Environmental Sciences, Fukuoka, 818-01, Japan  
SOURCE: Carcinogenesis (1996), 17(10), 2163-2169  
CODEN: CRNGDP; ISSN: 0143-3334  
DOCUMENT TYPE: Journal  
LANGUAGE: English

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L5 ANSWER 41 OF 60 CAPLUS COPYRIGHT 2001 ACS  
AB Photoinduced DNA-cleavage with C60 was investigated. A DNA-cleaving test of C60 dissolved in water with poly(vinylpyrrolidone) using pBR322 supercoiled plasmid showed that C60 had weak but significant DNA-cleaving activity under visible light irradiation. To increase the affinity of C60 for the DNA double strand, a C60 deriv. with an acridine group was synthesized by the addition reaction of 9-(4-azidomethylphenyl)acridine with C60. The DNA-cleaving activity of the C60-acridine adduct was much stronger than that of C60 itself. DNA cleavage may be caused by the active oxygen species generated by the C60 moiety.

ACCESSION NUMBER: 1996:618985 CAPLUS  
DOCUMENT NUMBER: 125:328484  
TITLE: Acridine Adduct of [60]Fullerene with Enhanced DNA-Cleaving Activity  
AUTHOR(S): Yamakoshi, Yoko Nakajima; Yagami, Takeshi; Sueyoshi, Shoko; Miyata, Naoki  
CORPORATE SOURCE: Division of Organic Chemistry, National Institute of Health Sciences, Setagaya, 158, Japan  
SOURCE: J. Org. Chem. (1996), 61(21), 7236-7237  
CODEN: JOCEAH; ISSN: 0022-3263  
DOCUMENT TYPE: Journal



LANGUAGE: English

L5 ANSWER 42 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Two different classes of water-sol. **fullerene** derivs., detergent-type, were synthesized. The derivs. were evaluated for their biol. activities including cytotoxicity, **DNA** cleavage, and inhibition of HIV-protease and other enzymes. Both classes of compds. display generally similar behavior except for their cytotoxicity spectra against several cell lines. The **fullerene** derivs. bearing N-methylpyrrole were found to be photo-inactive with respect to **DNA** cleaving activity and cytotoxicity. A study on the kinetics for the inhibition of HIV-protease with detergent type deriv. revealed that the compd. is a potent **fullerene**-based HIV protease inhibitor, inhibiting the enzyme activity in a reversible and competitive manner with a  $K_i$  value of 0.32  $\mu$ M.

ACCESSION NUMBER: 1996:528797 CAPLUS

DOCUMENT NUMBER: 125:237573

TITLE: Biological activity of water-soluble fullerenes. Structural dependence of **DNA** cleavage, cytotoxicity, and enzyme inhibitory activities including HIV-protease inhibition

AUTHOR(S): Nakamura, Eiichi; Tokuyama, Hidetoshi; Yamago, Shigeru; Shiraki, Takashi; Sugiura, Yukio

CORPORATE SOURCE: School Science, University Tokyo, Tokyo, 113, Japan

SOURCE: Bull. Chem. Soc. Jpn. (1996), 69(8), 2143-2151

CODEN: BCSJA8; ISSN: 0009-2673

DOCUMENT TYPE: Journal

LANGUAGE: English

L5 ANSWER 43 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review, with 70 refs. discussing properties, biol. activity (enzyme inhibition, antiviral activity, **DNA** cleavage, photodynamic therapy, etc.), and metab. and toxicity.

ACCESSION NUMBER: 1996:432291 CAPLUS

DOCUMENT NUMBER: 125:131332

TITLE: Biological applications of fullerenes

AUTHOR(S): Jensen, Anton W.; Wilson, Stephen R.; Schuster, David I.

CORPORATE SOURCE: Dep. Chem., New York Univ., New York, NY, 10003, USA

SOURCE: Bioorg. Med. Chem. (1996), 4(6), 767-779

CODEN: BMECEP; ISSN: 0968-0896

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

L5 ANSWER 44 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB **Fullerene** C60-linked oligodeoxyribonucleotide (C60-DON-1) was prepd. from bromoacetate **fullerene**. This C60-oligonucleotide conjugate was hybridized to a complementary single-stranded **DNA**. This system reacted with light and oxygen to damage only guanosines in

the single-stranded region which are closest to C60. The damage did not involve 102 as the active species but rather resulted from a single electron-transfer mechanism between guanosine and 3C60, as shown by comparison expts. with eosin-attached DON-1 and by the use of singlet oxygen quenchers.

ACCESSION NUMBER: 1996:212791 CAPLUS

DOCUMENT NUMBER: 125:11350

TITLE: Sequence-specific modification of guanosine in **DNA** by a C60-linked deoxyoligonucleotide: evidence for a non-singlet oxygen mechanism

AUTHOR(S): An, Yi-Zhong; Chen, Chi-Hong B.; Anderson, Jamey L.; Sigman, David S.; Foote, Christopher S.; Rubin, Yves

CORPORATE SOURCE: Dep. Chem. Biochem., Univ. California, Los Angeles, CA, 90095-1569, USA

SOURCE: Tetrahedron (1996), 52(14), 5179-89

DOCUMENT TYPE:  
LANGUAGE:

CODEN: TETRAB; ISSN: 0040-4020  
Journal  
English

L5 ANSWER 45 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Photodynamic action is the action of a sensitizer, light and oxygen on biol. materials. It can be mediated by electron or hydrogen-atom transfer or by singlet oxygen. Fullerenes (C60 and C70) are excellent photosensitizers for both types of reaction, as are derivs., dihydrofullerenes (DHF). A DHF bound to a deoxynucleotide and hybridized to complementary **DNA** damages guanines near the DHF, but the reaction appears to involve electron transfer rather than singlet oxygen. 58 Refs.

ACCESSION NUMBER: 1995:1000695 CAPLUS  
DOCUMENT NUMBER: 124:71193  
TITLE: Fullerenes as photosensitizers  
AUTHOR(S): Foote, Christopher S.  
CORPORATE SOURCE: Department Chemistry and Biochemistry, University California, Los Angeles, CA, 90095-1569, USA  
SOURCE: ACS Symp. Ser. (1995), 616(Light-Activated Pest Control), 17-23  
CODEN: ACSMC8; ISSN: 0097-6156  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: English

L5 ANSWER 46 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Fullerenes were vapor deposited on glass and plastic surfaces. These surfaces were then used to support the growth of mammalian cells and the attachment of **DNA** and protein moieties. Fullerenes in the presence of light and oxygen are known to generate singlet oxygen. Therefore, broad-spectrum visible light was directed onto Chinese hamster ovary cells growing on **fullerene** surfaces under different oxygen concns. Cell membranes were damaged by light treatments when oxygen was present, but not damaged when oxygen was absent. The pi-bonding system of

the fullerenes was thought likely to show properties of active carbon. Therefore, **DNA** and protein was dried onto **fullerene** films deposited on glass and polystyrene substrates. These biogenic factors were qual. detd. to bind better than to the glass or polystyrene surfaces directly. These findings may allow for applications whereby cellular damage and cellular processes are controlled at the cell surface with or without the presentation of biogenic factors.

ACCESSION NUMBER: 1995:991510 CAPLUS  
DOCUMENT NUMBER: 124:81414  
TITLE: Vapor-deposited **fullerene** surfaces as a photodynamic basement for attached cells and biogenic factors  
AUTHOR(S): Richmond, Robert C.; Gibson, Ursula J.  
CORPORATE SOURCE: Medical Sciences Division, NASA Johnson Space Center, Houston, TX, 77058, USA  
SOURCE: Proc. - Electrochem. Soc. (1995), 95-10(Proceedings of the Symposium on Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials, 1995), 684-95  
CODEN: PESODO; ISSN: 0161-6374  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 47 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A **fullerene** conjugate with a 14-base oligodeoxyribonucleotide has been synthesized. The oligonucleotide binds to single-stranded **DNA** by Watson-Crick bonds as well as to double-stranded

**DNA** by Hoogsteen hydrogen bonds. Thus, a bromoacetate deriv. of **fullerene** was synthesized and reacted with a thiol-terminated 14-mer to prepare the conjugate. Conjugate-mediated cleavage of a single-stranded 20-mer **DNA**, a 26-bp duplex **DNA**, and a 41-mer hairpin **DNA** contg. a 5-bp loop was demonstrated upon irradiation of the reaction mixture with a 1000 W xenon lamp while filtering

out

light of <300 nm. Specific photocleavage at guanine bases near the **fullerene** moiety was observed. The presence of the **fullerene** moiety did not inhibit formation of double- and triple-helix structures.

ACCESSION NUMBER: 1995:280579 CAPLUS  
DOCUMENT NUMBER: 123:1957  
TITLE: **Fullerene**-oligonucleotide conjugates:  
photoinduced sequence-specific **DNA** cleavage  
AUTHOR(S): Boutorine, Alexandre S.; Tokuyama, Hidetoshi;  
Takasugi, Masashi; Isobe, Hiroyuki; Nakamura, Eiichi;  
Helene, Claude  
CORPORATE SOURCE: Lab. Biophys., INSERM U201, Paris, F-75005, Fr.  
SOURCE: Angew. Chem. (1994), 106(23/24), 2526-9  
CODEN: ANCEAD; ISSN: 0044-8249  
DOCUMENT TYPE: Journal  
LANGUAGE: German

L5 ANSWER 48 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 43 refs. A variety of substituted cyclopropenone acetals have been prepared and studied for the purpose of gaining further insights into their organometallic and thermal chem. Acidic hydrolysis of the acetals gave the corresponding cyclopropenones, among these are a naturally occurring cyclopropenone antibiotic, penitricin. A new class

of

cysteine protease inhibitor can be realized if the penitricin moiety is contrived as a dipeptide-like binding site. Thermolysis of substituted cyclopropenone acetals generates vinyl carbene species that undergo [1 + 2] and [3 + 2] cycloaddition to electron-deficient olefins. The cyclopropenone acetal also serves as a precursor to a dipolar trimethylenemethane. The vinyl carbene and the trimethylenemethane species undergo cycloaddition to give buckminsterfullerenes, with which the various organic derivatives of fullerenes generated have been shown to exhibit photo-induced cytotoxicity, **DNA** cutting activity, and enzyme inhibition.

ACCESSION NUMBER: 1995:215811 CAPLUS  
DOCUMENT NUMBER: 122:30974  
TITLE: Synthetic chemistry of cyclopropenone acetals.  
Penitricin and buckminsterfullerene  
AUTHOR(S): Nakamura, Eiichi  
CORPORATE SOURCE: Dep. Chem., Tokyo Inst. Technol., Tokyo, 152, Japan  
SOURCE: Yuki Gosei Kagaku Kyokaishi (1994), 52(11), 935-45  
CODEN: YGKKAE; ISSN: 0037-9980  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: English

L5 ANSWER 49 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The authors have addressed the potential acute and subchronic toxic effects of fullerenes applied in benzene on the mouse skin. The acute toxic effects measured in this study included epidermal **DNA** synthesis and the induction of ornithine decarboxylase activity in the epidermis. At the topical dose of fullerenes used in these studies

(i.e.,

200 ug), the authors found no effect on either **DNA** synthesis or ornithine decarboxylase activity over a 72-h time course after treatment. The subchronic effects of the fullerenes as a mouse skin tumor promoter were assessed by repeatedly applying the chem. to the skin after initiation with the polycyclic aromatic hydrocarbon, DMBA. Repeated administration of the fullerenes for up to 24 wk postinitiation did not result in either benign or malignant skin tumor formation, whereas

promotion with the phorbol ester, TPA, resulted in the formation of benign skin tumors. Thus, fullerenes applied in benzene at a likely industrial exposure level do not cause acute toxic effects on the mouse skin epidermis.

ACCESSION NUMBER: 1994:428977 CAPLUS  
DOCUMENT NUMBER: 121:28977  
TITLE: Effects of acute and subchronic exposure of topically applied **fullerene** extracts on the mouse skin  
AUTHOR(S): Nelson, Mark A.; Domann, Frederick E.; Bowden, G. Tim;  
Hooser, Stephen B.; Fernando, Quintus; Carter, Dean E.  
CORPORATE SOURCE: Ariz. Cancer Cent., Univ. Ariz., Tucson, AZ, 85724, USA  
SOURCE: Toxicol. Ind. Health (1993), 9(4), 623-30  
CODEN: TIHEEC; ISSN: 0748-2337  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 50 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB Substrates having a surface coated with **fullerene** and a substance attached thereto are disclosed. Cell culture substrates having a **fullerene**-coated surface are useful in methods of growing cells on the **fullerene**-coated surface. Methods of prep. cell culture substrates for cell attachment and growth by coating a surface with **fullerene** are provided. Cells can be grown on a **fullerene**-coated surface in the presence of a substance such as a cytokine, growth hormone or a drug, to evaluate the interaction between the substance and the cells. Methods for increasing cell membrane permeability and for introducing a substance, such as a **DNA** or RNA vector, into a cell are also provided. The methodol. of the invention

was applied to CHO cell culture.

ACCESSION NUMBER: 1994:158195 CAPLUS  
DOCUMENT NUMBER: 120:158195  
TITLE: **Fullerene**-coated surfaces and cell-culture uses thereof  
INVENTOR(S): Richmond, Robert C.; Gibson, Ursula J.  
PATENT ASSIGNEE(S): Trustees of Dartmouth College, USA  
SOURCE: PCT Int. Appl., 52 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9400552	A1	19940106	WO 1993-US5680	19930614
W: CA, JP				
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 5310669	A	19940510	US 1992-901911	19920622
PRIORITY APPLN. INFO.:			US 1992-901911	19920622

=> d 15 51-60 abs ibib

L5 ANSWER 51 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The bis(monosuccinimide) deriv. of p,p'-bis(2-aminoethyl)diphenyl-C60 (I), prep. by the fulleroid route, is active against human immunodeficiency virus type 1 (HIV-1) and HIV-2 (50% effective concn. [EC50] averaging .apprx.6 .mu.M) in acutely or chronically infected human lymphocytes and

is active in vitro against 3'-azido-3'-deoxythymidine-resistant HIV-1 (EC50,  $\approx$  3  $\mu$ M). The virucidal properties of I were confirmed by virus inactivation assays. I was noncytotoxic up to 100  $\mu$ M in peripheral blood mononuclear cells and H9, Vero, and CEM cells. In cell-free assays, whereas the **fullerene** showed comparable activity against HIV-1 reverse transcriptase and DNA polymerase  $\alpha$ . (50% inhibitory concn. of  $\approx$  5  $\mu$ M), it demonstrated selective activity against HIV-1 protease.

ACCESSION NUMBER: 1994:45238 CAPLUS  
DOCUMENT NUMBER: 120:45238  
TITLE: Synthesis and virucidal activity of a water-soluble, configurationally stable, derivatized C60 **fullerene**  
AUTHOR(S): Schinazi, Raymond F.; Sijbesma, Rint; Srdanov, Gordana; Hill, Craig L.; Wudl, Fred  
CORPORATE SOURCE: Sch. Med., Emory Univ., Atlanta, GA, 30322, USA  
SOURCE: Antimicrob. Agents Chemother. (1993), 37(8), 1707-10  
CODEN: AMACQ; ISSN: 0066-4804  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 52 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB The reaction of a **fullerene** bearing a hydroxyl group (1) with succinic anhydride in the presence of 4-dimethylaminopyridine gave the **fullerene** carboxylic acid 2. This acid and its triethylamine salt 3 are found to be miscible in water. These compds. show distinct cytotoxicity against the HeLa cell line under irradiation with visible light. No activity was observed in the dark. They are able to cleave DNA under light irradiation, cleaving supercoiled plasmid DNA (form I) to nicked circular (form II) and linear duplex (form III). Light irradiation was also found to be mandatory for the DNA cleavage activity. The cleavage takes place preferentially at the guanine bases. Brief studies on enzyme inhibition under light irradiation indicated that 2 and 3 inhibit proteinase activity of several classes of cysteine and serine proteinases.

ACCESSION NUMBER: 1993:554990 CAPLUS  
DOCUMENT NUMBER: 119:154990  
TITLE: Photoinduced biochemical activity of **fullerene** carboxylic acid  
AUTHOR(S): Tokuyama, Hidetoshi; Yamago, Shigeru; Nakamura, Eiichi; Shiraki, Takashi; Sugiura, Yukio  
CORPORATE SOURCE: Dep. Chem., Tokyo Inst. Technol., Meguro, 152, Japan  
SOURCE: J. Am. Chem. Soc. (1993), 115(17), 7918-19  
CODEN: JACSAT; ISSN: 0002-7863  
DOCUMENT TYPE: Journal  
LANGUAGE: English

L5 ANSWER 53 OF 60 CAPLUS COPYRIGHT 2001 ACS

AB A review with 24 refs. A principle of scanning tunneling microscope (STM) and the observation of mol. compds. (liq. crystals, monomol. membranes, DNA, proteins, polymers, and fullerenes) are described.

ACCESSION NUMBER: 1993:70899 CAPLUS  
DOCUMENT NUMBER: 118:70899  
TITLE: Observation of molecular images with STM  
AUTHOR(S): Miyamura, Kazuo; Gohshi, Yohichi  
CORPORATE SOURCE: Fac. Eng., Univ. Tokyo, Tokyo, 113, Japan  
SOURCE: Kagaku (Kyoto) (1992), 47(12), 872-3  
CODEN: KAKYAU; ISSN: 0451-1964  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: Japanese

L5 ANSWER 54 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

AB **Fullerene** (C60, C70, etc.) is an effective photosensitizer and its utilization as a pharmacophore for photo-chemotherapy of tumors has

received considerable attention. We developed a method to solubilize fullerene into water with polyvinylpyrrolidone (PVP) as a detergent. By using thus prepared aqueous fullerene solutions, we have clarified a series of biological activities of fullerene under photoirradiation which include DNA-cleavage, hemolysis, mutagenicity, cancer-initiation, and cell-toxicity. A newly synthesized C60 derivative with an acridine moiety as a DNA-chelating function showed much more effective DNA-cleaving activity in the presence of NADH. Visible-light irradiation of PVP-solubilized C60 in water in the presence of NADH as a reductant and molecular oxygen resulted in the formation of O2cndtdot-, which was detected by the EPR spin-trapping method. Formation of O2cndtdot- was also evidenced by the direct observation of a characteristic signal of O2cndtdot- by the use of a low-temperature EPR technique at 77 K. On the other hand, no formation of 1O2 was observed by the use of TEMP as a 1O2 trapping agent. No near-IR luminescence of 1O2 was also observed in the aqueous C60/PVP/O2 system. These results suggest that photoinduced bioactivities of the PVP-solubilized fullerene are caused not by 1O2, but by reduced oxygen species (O2cndtdot-, cndtdotOH) which are generated by the electron-transfer reaction of C60cndtdot- with molecular oxygen.

ACCESSION NUMBER: 2001:33479 BIOSIS  
DOCUMENT NUMBER: PREV200100033479  
TITLE: Reactive species responsible for biological actions of photoexcited fullerenes.  
AUTHOR(S): Miyata, Naoki (1); Yamakoshi, Yoko; Nakanishi, Ikuo  
CORPORATE SOURCE: (1) Division of Organic Chemistry, National Institute of Health Sciences, 1-18-1, Kamiyoga, Setagaya-ku, Tokyo, 158-8501 Japan.  
SOURCE: Yakugaku Zasshi, (October, 2000) Vol. 120, No. 10, pp. 1007-1016. print.  
ISSN: 0031-6903.  
DOCUMENT TYPE: General Review  
LANGUAGE: Japanese  
SUMMARY LANGUAGE: English

L5 ANSWER 55 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

AB Buckminsterfullerenols were recently investigated for their protective properties in different models of acute and chronic neurodegeneration. We tested C3-fullero-tris-methanodicarboxylic acid in our in vitro model of apoptotic neuronal death, which consists of shifting the culture K<sup>+</sup> concentration from 25 to 5 mM for rat cerebellar granule cells. The impairment of mitochondrial respiratory function as well as chromatin derangement and fragmentation of DNA in apoptotic oligonucleosomes that occur in these conditions were protected by this compound in a concentration-dependent way. To assess whether antioxidant activity could account for the rescue of cerebellar granule cells from apoptosis, we tested the fullerene derivative under FeSO4-induced oxidative stress and found significant protection. Thus, we visualized membrane and cytoplasmic peroxides and reactive oxygen species and found a significant reduction of the species after 24 h in 5 mM K<sup>+</sup> with the fullerene derivative. Such evidence suggests that this compound exerts a protective role in cerebellar granule cell apoptosis, likely reducing the oxidative stress.

ACCESSION NUMBER: 2000:143110 BIOSIS  
DOCUMENT NUMBER: PREV200000143110  
TITLE: C3-fullero-tris-methanodicarboxylic acid protects cerebellar granule cells from apoptosis.  
AUTHOR(S): Bisaglia, M.; Natalini, B.; Pellicciari, R.; Straface, E.; Malorni, W.; Monti, D.; Franceschi, C.; Schettini, G. (1)  
CORPORATE SOURCE: (1) Unit of Pharmacology and Neuroscience, Advanced Biotechnology Centre (CBA), Largo R. Benzi 10, 16132, Genova Italy  
SOURCE: Journal of Neurochemistry., (March, 2000) Vol. 74, No. 3,

DOCUMENT TYPE: Article  
LANGUAGE: English  
SUMMARY LANGUAGE: English

L5 ANSWER 56 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

ACCESSION NUMBER: 2000:86569 BIOSIS

DOCUMENT NUMBER: PREV200000086569

TITLE: **Fullerene**: A photosensitizer effectively generates oxyl radicals to cause **DNA** cleavage.

AUTHOR(S): Miyata, Naoki (1); Yamakoshi, Yoko (1)

CORPORATE SOURCE: (1) Division of Organic Chemistry, National Institute of Health Sciences, Kamiyoga, Setagaya-ku, Tokyo, 158-8501 Japan

SOURCE: Free Radical Biology & Medicine, (1999) Vol. 27, No.

SUPPL.

1, pp. S96.

Meeting Info.: 6th Annual Meeting of the Oxygen Society

New

Orleans, Louisiana, USA November 18-22, 1999 The Oxygen Society

. ISSN: 0891-5849.

DOCUMENT TYPE: Conference

LANGUAGE: English

L5 ANSWER 57 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

AB **Fullerene** C-60 dissolved in polyvinylpyrrolidone was mutagenic for Salmonella strains TA102, TA104 and YG3003 in the presence of rat liver microsomes when it was irradiated by visible light. The mutagenicity

was elevated in strain YG3003, a repair enzyme-deficient mutant of TA102. The mutation was reduced in the presence of beta-carotene and parabromophenacyl bromide, a scavenger and an inhibitor, respectively, of phospholipase. The results suggest that singlet oxygen was generated by irradiating the C-60 by visible light and that the mutagenicity was due

to

oxidized phospholipids in rat liver microsomes. Of the phospholipids in rat liver microsomes, the linoleate fraction isolated by high performance liquid chromatography was a major component, and played an important role in mutagenicity. Methyl linoleate, which was prepared for gas chromatographic analysis, was readily oxidized to hydroperoxymethyl linoleate, and associated with both 10- and 12-hydroxyl derivatives with

a

double bond in chemical structure by singlet oxygen: radicals to the hydroxyl function were probably generated. Because of the instability of the hydroxymethyl linoleate radicals, guanine residues generated

radicals.

The results of ESR spectrum analysis suggested generation of radicals at the guanine base but not thymine, cytosine and adenine bases as estimated with the g value of 2.0150. On the other hand, the singlet oxygen-generating C-60 formed 8-hydroxydeoxyguanosine (8-OHdG) upon treatment with 2' deoxyguanosine and microsomes or linoleate. The formation of 8-OH-dG was highly elevated in the presence of microsomes

and

linoleate. The level of 8-OH-dG formed with and without the microsome fraction was 47 and 9.6 units, respectively, per 10<sup>-4</sup> deoxyguanosine. It was considered that the mechanism is indirect action of singlet oxygen

due

to lipid peroxidation of linoleate that causes oxidative **DNA** damage.

ACCESSION NUMBER: 1996:563177 BIOSIS

DOCUMENT NUMBER: PREV199799292533

TITLE: Mutagenicity of the **fullerene** C-60-generated singlet oxygen dependent formation of lipid peroxides.

AUTHOR(S): Sera, Nobuyuki; Tokiwa, Hiroshi (1); Miyata, Naoki  
CORPORATE SOURCE: (1) Dep. Environ. Health, Kyushu Women's University,  
Kitayushu 807 Japan  
SOURCE: Carcinogenesis (Oxford), (1996) Vol. 17, No. 10, pp.  
2163-2169.  
ISSN: 0143-3334.  
DOCUMENT TYPE: Article  
LANGUAGE: English

L5 ANSWER 58 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

AB A C-60-linked deoxyoligonucleotide (C-60-DON-1) was prepared from bromoacetate 3. This C-60-oligonucleotide conjugate was hybridized to a complementary single-stranded **DNA**. This system reacted with light and oxygen to damage only guanosines in the single-stranded region which are closest to C-60. The damage did not involve 10-2 as the active species but rather resulted from a single electron-transfer mechanism between guanosine and 3C-60, as shown by comparison experiments with eosin-attached DON-1 and by the use of singlet oxygen quenchers.

ACCESSION NUMBER: 1996:237779 BIOSIS

DOCUMENT NUMBER: PREV199698785908

TITLE: Sequence-specific modification of guanosine in **DNA** by a C-60-linked deoxyoligonucleotide: Evidence for a non-singlet oxygen mechanism.

AUTHOR(S): An, Yi-Zhong; Chen, Chi-Hong B.; Anderson, Jamey L.; Sigman, David S.; Foote, Christopher S.; Rubin, Yves (1)

CORPORATE SOURCE: (1) Dep. Chem. Biochem., Univ. California Los Angeles, Los Angeles, CA 90095-1569 USA

SOURCE: Tetrahedron, (1996) Vol. 52, No. 14, pp. 5179-5189.  
ISSN: 0040-4020.

DOCUMENT TYPE: Article

LANGUAGE: English

L5 ANSWER 59 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

AB The recent discovery that fullerenes (C60) can be produced in macroscopic quantities has sparked much interest in the chemistry of this unusual molecule. Concerns have also arisen about the potential carcinogenic effects of this molecule. We have addressed the potential acute and subchronic toxic effects of fullerenes applied in benzene on the mouse skin. The acute toxic effects measured in this study included epidermal **DNA** synthesis and the induction of ornithine decarboxylase activity in the epidermis. At the topical dose of fullerenes used in

these

studies (i.e., 200  $\mu$ -g), we found no effect on either **DNA** synthesis or ornithine decarboxylase activity over a 72 hour time course after treatment. The subchronic effects of the fullerenes as a mouse skin tumor promoter was assessed by repeatedly applying the chemical to the skin after initiation with the polycyclic aromatic hydrocarbon, 7,12-dimethylbenzanthracene (DMBA). Repeated administration of the fullerenes for up to 24 weeks post-initiation did not result in either benign or malignant skin tumor formation, whereas promotion with the phorbol ester, 12-O-tetradecanoyl-phorbol-13-acetate (TPA) resulted in

the

formation of benign skin tumors. Our data indicate that fullerenes applied

in benzene at a likely industrial exposure level do not cause acute toxic effects on the mouse skin epidermis.

ACCESSION NUMBER: 1994:27182 BIOSIS

DOCUMENT NUMBER: PREV199497040182

TITLE: Effects of acute and subchronic exposure of topically applied **fullerene** extracts on the mouse skin.

AUTHOR(S): Nelson, Mark A. (1); Domann, Frederick E.; Bowden, G. Tim; Hooser, Stephen B.; Fernando, Quintus; Carter, Dean E.

CORPORATE SOURCE: (1) Dep. Pathol., Room 4921, Univ. Ariz., 1515 N. Campbell,

Tucson, AZ 85724 USA



SOURCE: Toxicology and Industrial Health, (1993) Vol. 9, No. 4,  
pp.

623-630.  
ISSN: 0748-2337.

DOCUMENT TYPE: Article

LANGUAGE: English

L5 ANSWER 60 OF 60 BIOSIS COPYRIGHT 2001 BIOSIS

AB The bis(monosuccinimide) derivative of

p,p'-bis(2-aminoethyl)diphenyl-C-60

(compound 1), prepared by the fulleroid route, is active against human immunodeficiency virus type 1 (HIV-1) and HIV-2 (50% effective concentration (EC-50) averaging approx 6 mu-M) in acutely or chronically infected human lymphocytes and is active in vitro against 3'-azido-3'-deoxythymidine-resistant HIV-1 (EC-50, approx 3 mu-M). The virucidal properties of compound 1 were confirmed by virus inactivation assays. Compound 1 was noncytotoxic up to 100 mu-M in peripheral blood mononuclear cells and H9, Vero, and CEM cells. In cell-free assays, whereas the **fullerene** showed comparable activity against HIV-1 reverse transcriptase and **DNA** polymerase alpha (50% inhibitory concentration of approx 5 mu-M), it demonstrated selective activity

against

HIV-1 protease.

ACCESSION NUMBER: 1993:430124 BIOSIS

DOCUMENT NUMBER: PREV199396084749

TITLE: Synthesis and virucidal activity of a water-soluble, configurationally stable, derivatized C-60 **fullerene**.

AUTHOR(S): Schinazi, Raymond F. (1); Sijbesma, Rint; Srdanov, Gordana;

Hill, Craig L.; Wudl, Fred

CORPORATE SOURCE: (1) Lab. Biochemical Pharmacology, Dep. Pediatrics, Emory Univ. Sch. Med., Atlanta, GA 30322 USA

SOURCE: Antimicrobial Agents and Chemotherapy, (1993) Vol. 37, No. 8, pp. 1707-1710.

ISSN: 0066-4804.

DOCUMENT TYPE: Article

LANGUAGE: English

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(FILE 'HOME' ENTERED AT 13:05:18 ON 04 MAR 2001)

FILE 'CAPLUS, BIOSIS, CABA' ENTERED AT 13:05:46 ON 04 MAR 2001

L1 17787 S FULLERENE  
L2 1165620 S DNA  
L3 136616 S COMPACT?  
L4 500312 S DERIVAT?  
L5 60 S L1 AND L2  
L6 1 S L5 AND L3  
L7 890 S L1 AND L4